

LEV HUSET





Good daylight from several directions is essential for the quality of living in a small dwelling.



To think in qualitative square meters rather than quantitative ones.

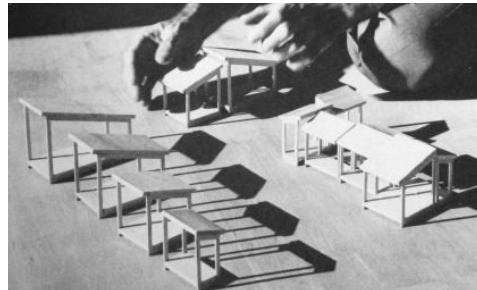


Can we build with respect for the Danish urban and housing tradition while also encouraging greater resource and spatial awareness?

Edge zones and the interaction between indoors and outdoors are an important prerequisite for urban life in Copenhagen's neighborhoods.

Copenhagen's distinct character: buildings with an articulated base facing the city, calm façades framing the dwellings, and steep roofs utilized for housing with dormers and skylights surrounding a shared courtyard.

Alcoves and multifunctional common spaces – micro-dwellings of the past?



Flexible and modular – a part of the Danish design tradition. Ref. Utzon Espansiva



Foto: Nicolas Cosedis

The metropolis's climate and housing challenges

Danes use too much living space per person. The average apartment offers 57 m² per person, while in Copenhagen the average is 43 m². To live more sustainably in the future, we need to inhabit smaller homes and share more functions.

The growing urbanization and expansion of Denmark's major city regions – particularly Copenhagen – have placed increasing pressure on the existing housing stock. Copenhagen continues to grow, and projections indicate that by 2060, the city will have 120,000 more residents than today (Source: *City of Copenhagen, Housing Report 2024*). This population growth intensifies the demand for centrally located housing. Today, Copenhageners live more densely than before, despite the average dwelling size having increased. At the same time, new family structures – such as more single parents, shared custody arrangements, and flexible, non-married partnerships – play an ever-larger role in shaping housing demand. In Copenhagen, the number of single-adult households remains high, while the number of single parents, couples with children, and households with three or more adults is also on the rise.

The LEV House housing concept creates possibilities and contributes to its context. It makes use of the edge zone and supports urban life. It is designed to meet the environmental challenges we face in the city and to give back in a positive and regenerative way. At the same time, it seeks to address the spatial and qualitative shortcomings that characterize much new housing today—where many dwellings are deep and narrow, inflexible and homogeneous, and often inconsistent in terms of material quality and shared spaces. We want to offer more than that.

The target group is the modern urban dweller — young people, families, and senior couples. But also singles, divorcees, blended families, newcomers, students, and co-living communities.

This group consists of people who want to live centrally and be part of the city — and who, in turn, contribute to the life of the neighborhood.

Future urban dwellings adapted to this group are characterized by:

- **smaller and more flexible use of space in dense urban areas**
- **concentrated shared spaces**
- **dwellings and buildings that form an active part of city life**
- **housing with clear architectural quality and a strong, positive identity**
- **accessible and open to diversity**

The concept stems primarily from a desire to ensure diversity — a diversity of housing types with the possibility to create multiple rooms and functional zones within fewer square meters. It draws inspiration from the flexibility of the traditional Copenhagen apartment, where units can be combined or expanded in step with demographic change.



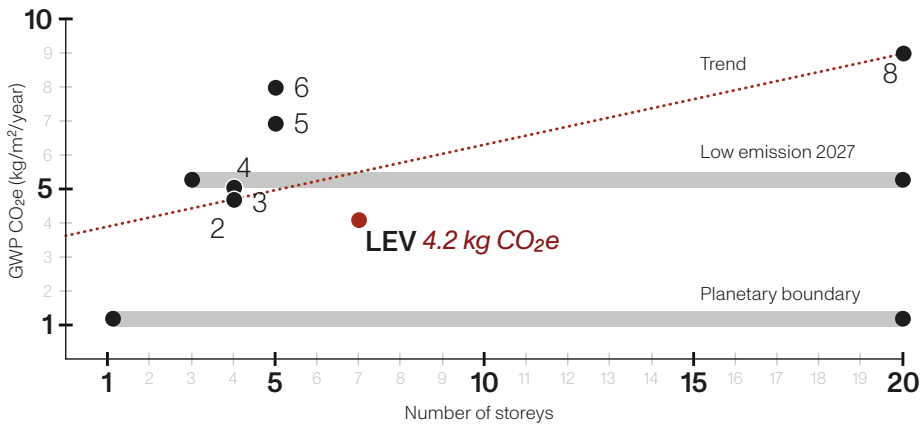
Best-practice

The taller the building – the greater the climate impact!

It may seem counterintuitive, but an analysis of several Danish building projects with a strong focus on reducing climate impact shows a clear correlation between building height and CO₂-equivalent emissions.

Beyond three to five storeys, additional requirements for circulation routes and fire safety measures increase resource consumption. However, taller buildings also have certain advantages, as some components — such as roof structures or solar panels — can be distributed across a larger floor area than in lower buildings.

LEV will therefore be limited to a maximum height of 22 metres to the upper floor level, balancing the project's ambition for compact urban density with low environmental and climate impact.





1
Planetary boundaries
GWP_{max}: 1.2 - Storeys: x



2
Living Places
GWP: 3.85 - Storeys: 3



3
Home.Earth Nærheden
GWP: 4.7 - Storeys: 4



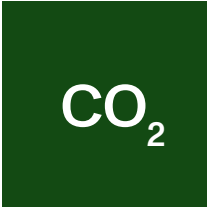
4
Ripple Residence
GWP: 5 - Storeys: 4



5
SolarHouse
GWP: 6.93 - Storeys: 5



6
MiniCO₂ Træ
GWP: 8.01 - Storeys: 5



7
Low emission 2027
GWP: 5.3 - Storeys: x



8
TRÆ office building
GWP: 9 - Storeys: 20

Comparison of GWP for a selection of Danish projects with a strong focus on sustainability.



VISION

To build the first regenerative multi-storey housing project with an impact below 4.5 kg CO₂e in a building of more than five storeys.

To create healthy and community-oriented housing typologies that reduce the square-metre use per person and demonstrate how we can live more closely together in an urban context.

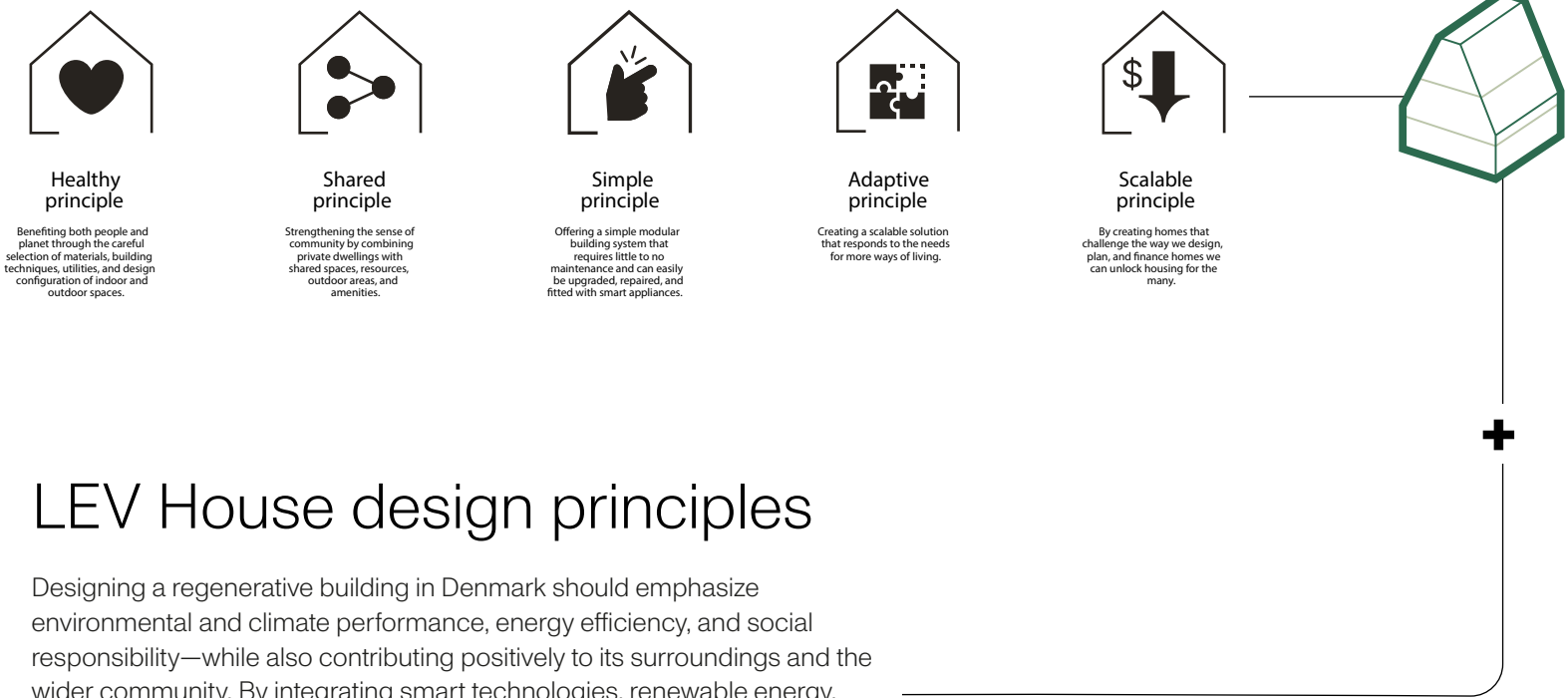


“An experiment is worth more than a thousand expert assumptions.

Villum Kann Rasmussen

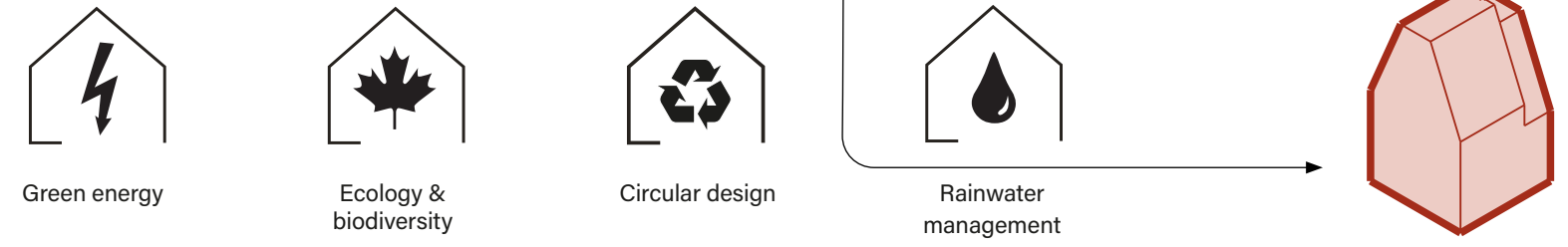


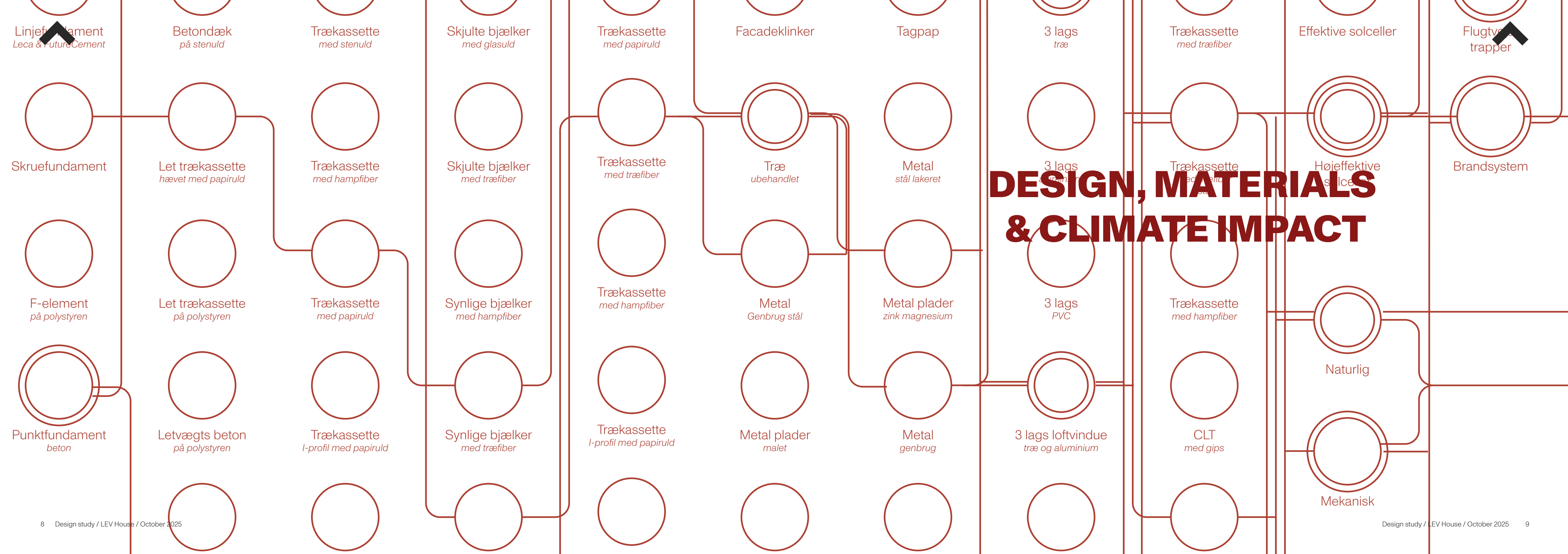
Living Places design principles



LEV House design principles

Designing a regenerative building in Denmark should emphasize environmental and climate performance, energy efficiency, and social responsibility—while also contributing positively to its surroundings and the wider community. By integrating smart technologies, renewable energy, bio-based materials, and resilient design strategies, it is possible to create a building that enhances both the local ecosystem and the well-being of its residents. The ultimate goal is not merely to minimize negative impacts, but to establish a regenerative system—one in which the building actively gives back to the world around it.





Linjefundament
Leca & FutureCement

Skruefundament

F-element
på polystyren

Punktfundament
beton

Betondæk
på stenuld

Let trækassette
hævet med papiruld

Let trækassette
på polystyren

Letvægts beton
på polystyren

Trækassette
med stenuld

Trækassette
med hampfiber

Trækassette
med papiruld

Trækassette
I-profil med papiruld

Skjulte bjælker
med glasuld

Skjulte bjælker
med træfiber

Synlige bjælker
med hampfiber

Synlige bjælker
med træfiber

Trækassette
med papiruld

Trækassette
med træfiber

Trækassette
med hampfiber

Trækassette
I-profil med papiruld

Facadeklinker

Træ
ubehandlet

Metal
Genbrug stål

Metal plader
malet

Tagpap

Metal
stål lakeret

Metal plader
zink magnesium

Metal
genbrug

3 lags
træ

3 lags
aluminium

3 lags
PVC

3 lags loftvindue
træ og aluminium

Trækassette
med træfiber

Trækassette
med hampfiber

Trækassette
med hampfiber

CLT
med gips

Effektive solceller

Højeffektive
solceller

Naturlig

Mekanisk

Flugtvejs
trapper

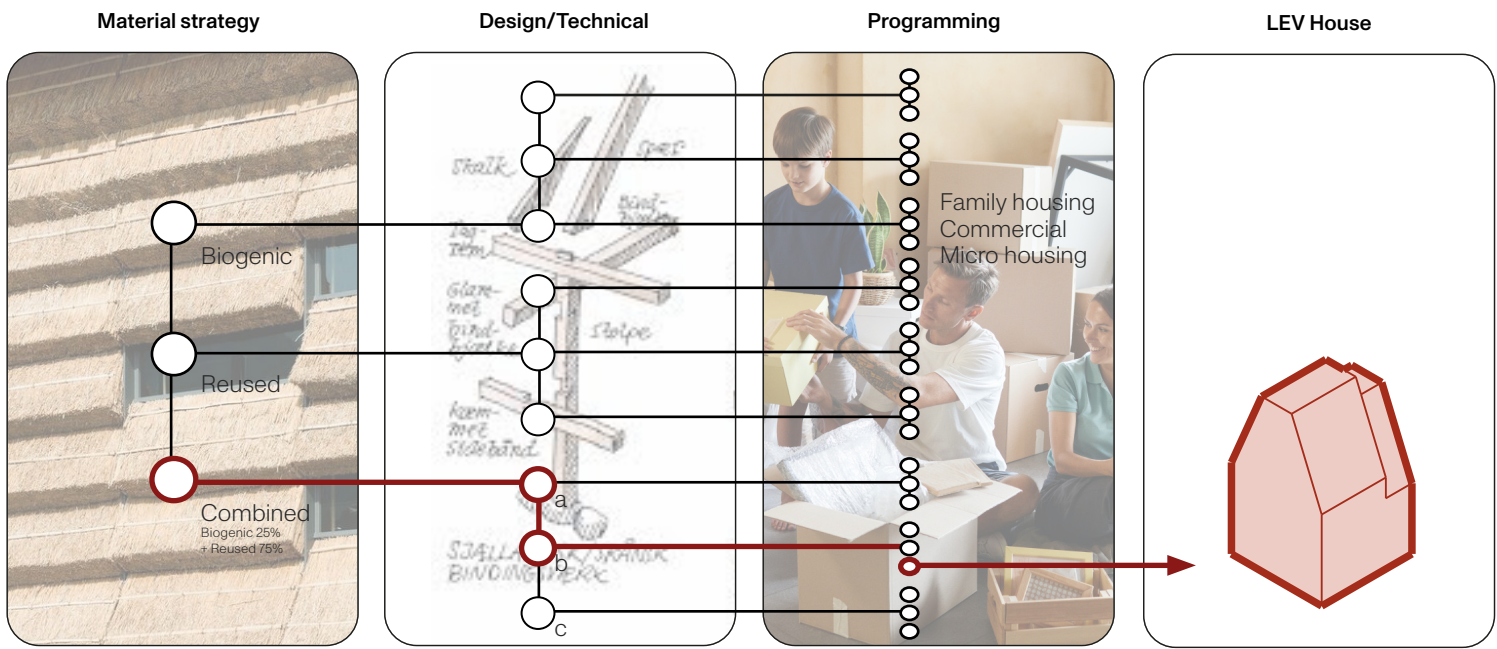
Brandsystem

DESIGN, MATERIALS & CLIMATE IMPACT



Methodology and principles

Many factors shape a project's overall climate impact — and each design decision also rules out other possible paths. The following describes the methodology and calculation principles used, grounded in the project's known conditions and available knowledge.



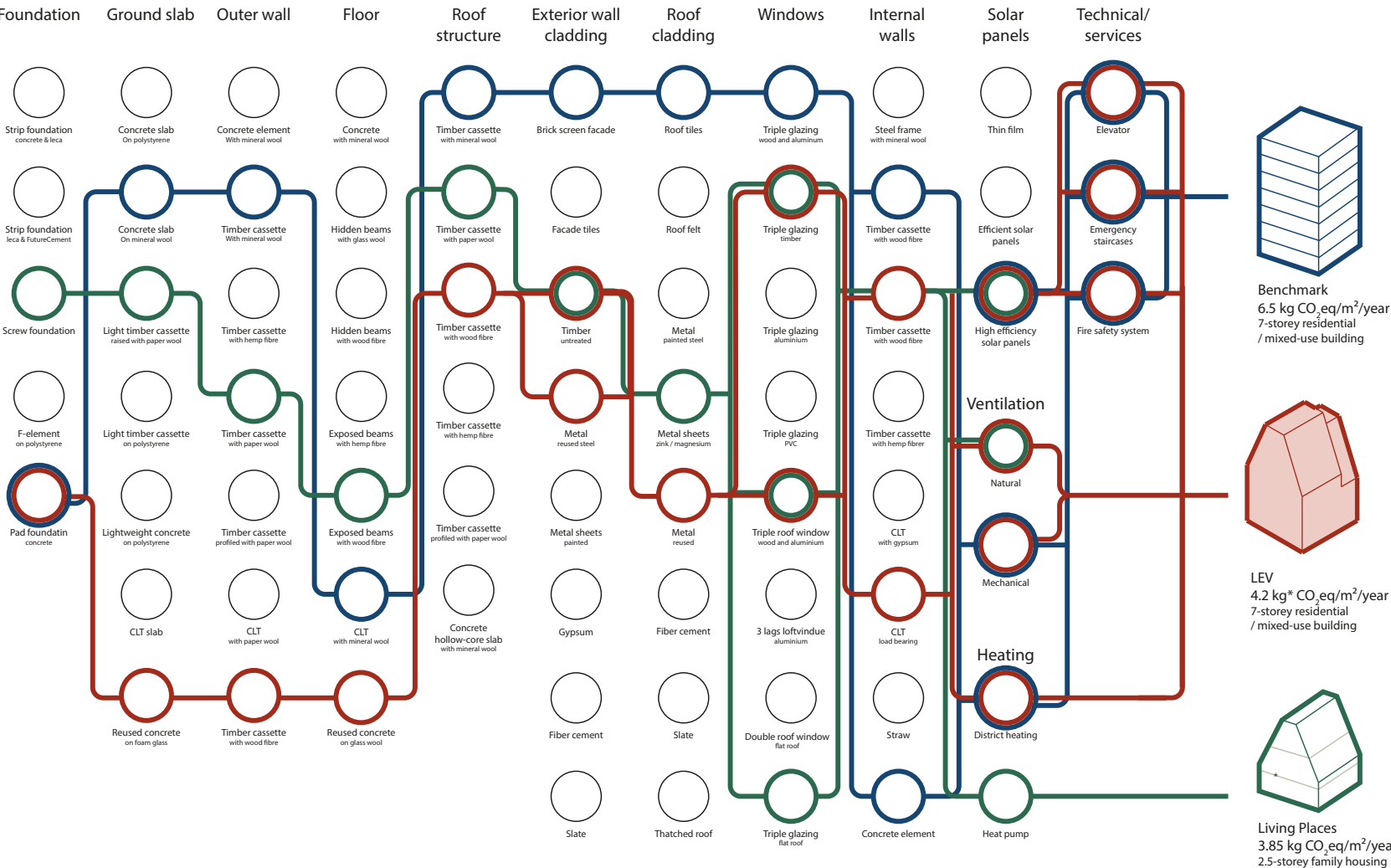
Experience shows that there are many ways to achieve low climate impact in construction. LEV's strategy is to use a very high proportion of reused materials, combined with biogenic materials and materials with a high potential for future reuse.

As LEV exceeds five storeys, a robust fire safety strategy will be a prerequisite for project approval. Therefore, we recommend a hybrid structural system with a strong focus on reused components and proven technical solutions, in order to create a project that is as simple and replicable as possible.

The project's program and functions directly influence its overall climate footprint: Does it include extensive installations and lightweight partitions, or will the window area need to be increased to meet daylight requirements for workplaces?



URBAN LIVING's climate impact depends on a wide range of structural, material, technical, and programmatic decisions, as well as external requirements such as planning conditions and fire safety regulations. The diagram illustrates a possible pathway for achieving a significant reduction in climate and resource impact compared to a benchmark project.





Form and materials

The building's form influences both its climate impact and biodiversity performance, as well as urban space and housing quality. The climate footprint is affected by the overall façade treatment and the extent of material use. A more varied volume increases material consumption compared to a simple geometry.

A compact form with moderate building depth and height minimizes material use and can, in itself, have a CO₂-reducing effect. However, this must be balanced with spatial quality — for example, by incorporating roof windows or light shafts that bring daylight into the building's interior.

LEV House, with its compact 18×18 m footprint and distinct roof geometry, demonstrates the potential for achieving an optimized climate profile through form and proportion, while maintaining a strong architectural character.

LEV Max

Area: 1,720 m²
Envelope-to-area ratio: 1.28

GWP/m²/year: 4.1 kg CO₂e

Heavy walls per storey: 30%
Wet rooms per storey: 15%

LEV Next

Area: 1,720 m²
Envelope-to-area ratio: 1.23

GWP/m²/year: 4.2 kg CO₂e

*Preliminary calculation – may vary by ±10% during further project development.

LEV Mix

Area: 1,720 m²
Envelope-to-area ratio: 1.44

GWP/m²/year: 4.3 kg CO₂e

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When the building height is increased by 200 mm per storey and concrete decks are replaced with biogenic decks, 0.4 kg CO₂/m²/year can be saved.

Source: Dilemmas and Synergies between Biodiversity, Climate, and Urban Quality, City of Copenhagen, 2025

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When the building depth increases from 12 to 14 metres, 0.3 kg CO₂/m²/year can be saved in energy and material.



Roof form

There is an increasing focus on how new buildings appear in the urban landscape. In recent years, much new construction has been perceived as monotonous and lacking connection to local character or context. This has led to both public criticism and a growing political awareness, reflected in planning documents where references to earlier architectural styles and roof forms have begun to re-emerge.

By reviewing a selection of 17 local plans from across Denmark over the past 10–15 years—along with a few newer projects based on older plans and one quality programme—we gained insight into the specific regulations applied when new multi-storey housing is designed without flat roofs. The level of detail varies, but the documents typically require roofs with varying degrees of pitch and define specific roof forms, sometimes supported by drawings or figures.

LEV House therefore explores a pitched roof form, drawing on the architectural tradition of varied and terraced roofscapes to create identity, rhythm, and spatial quality within a contemporary framework.

Source: Dilemmas and Synergies between Biodiversity, Climate, and Urban Quality, City of Copenhagen, 2025

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The roof is an important part of a building's expression and can play a significant functional role. Climate considerations and the potential for green roof spaces must be carefully balanced when determining the roof design.

Flat roofs can provide valuable outdoor areas but generally have a higher climate impact than pitched roofs. Soil layers and planting require additional structural capacity and are difficult to construct using biogenic materials.

A flat roof does not create optimal conditions for structures made from biogenic materials, as these are often more sensitive to moisture. When building with biogenic materials, a pitched roof can therefore be an advantageous solution.

Pitched roofs typically have a lower CO₂ footprint, as they can be built using biogenic materials and without the use of pressure-resistant insulation, which has a high CO₂ impact.

Pitched roofs can accommodate apartments or storage spaces, and when designed with an overhang, they provide constructive protection for the façade. Architecturally, pitched roofs help shape and define a building's silhouette, enhancing its contribution to the urban space — though they also increase overall building height.

In general, pitched roofs have a longer lifespan than flat roofs, and rainwater is easier to collect from a sloping surface than from a flat one.

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By constructing a pitched roof instead of a flat roof, CO₂ emissions can be reduced by 0.2 kg CO₂/m²/year.

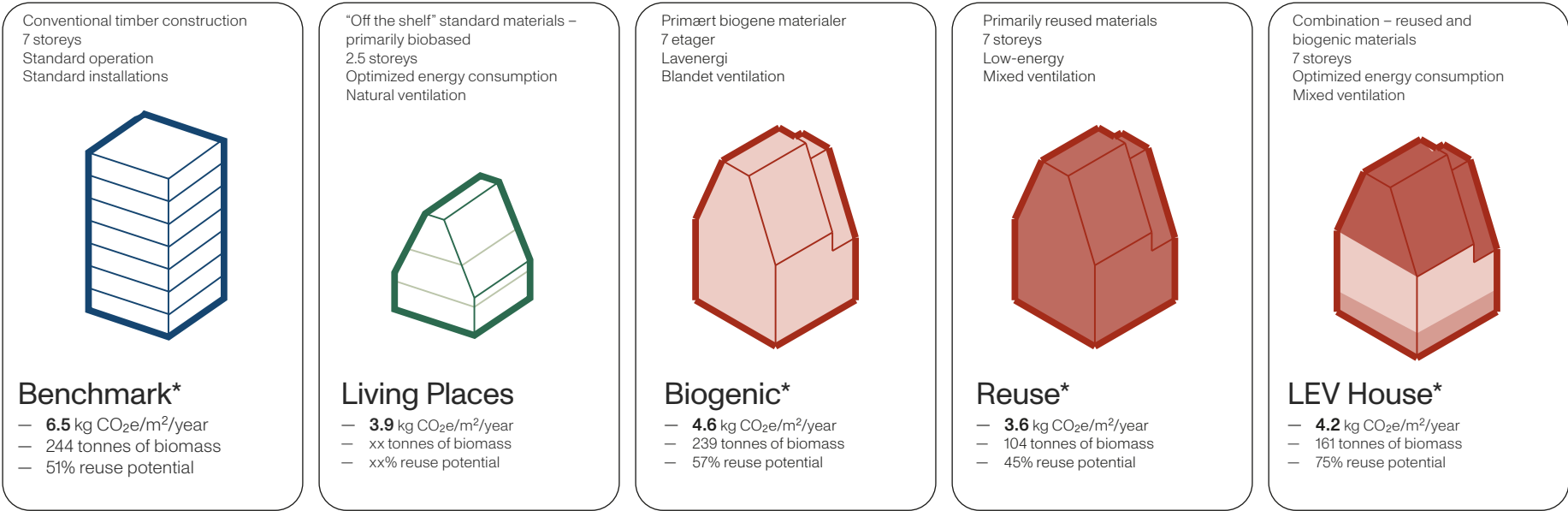


Material strategy: comparison of materials

The building will be constructed with little to no use of new concrete, and brick will only be used in the form of reused materials. In addition, materials with CO₂-storing properties (such as biogenic materials) will be applied. LEV House's material strategy relies on a high proportion of reused materials, supplemented by biogenic components, to achieve the desired low climate impact.

Reusing materials is a key approach to reducing the building's CO₂ emissions and addressing off-site biodiversity impacts. It is also becoming increasingly necessary due to global resource scarcity. Recycling involves more extensive reprocessing of materials — either to reuse them for the same function or to repurpose them for a new one. Wherever possible, direct reuse should be prioritized.

New CO₂-reducing materials will continue to emerge on the market — and the design must allow room for their inclusion. At this stage, it is not possible to predict exactly which materials will be available at the time of construction. The project therefore operates with a palette of options across the three primary surfaces: roof, façade, and base. To ensure a cohesive architectural expression, the building employs a graduated colour scale ranging from red to black. This choice underscores its role as a generator building, establishing contrast and identity within its lighter-toned surroundings.



Heavy walls per storey: 30%
Wet rooms per storey: 15%
* Fire safety and structural conditions must be further specified and may affect the overall climate impact.

*Preliminary calculation – may vary by ±10% during further project development.

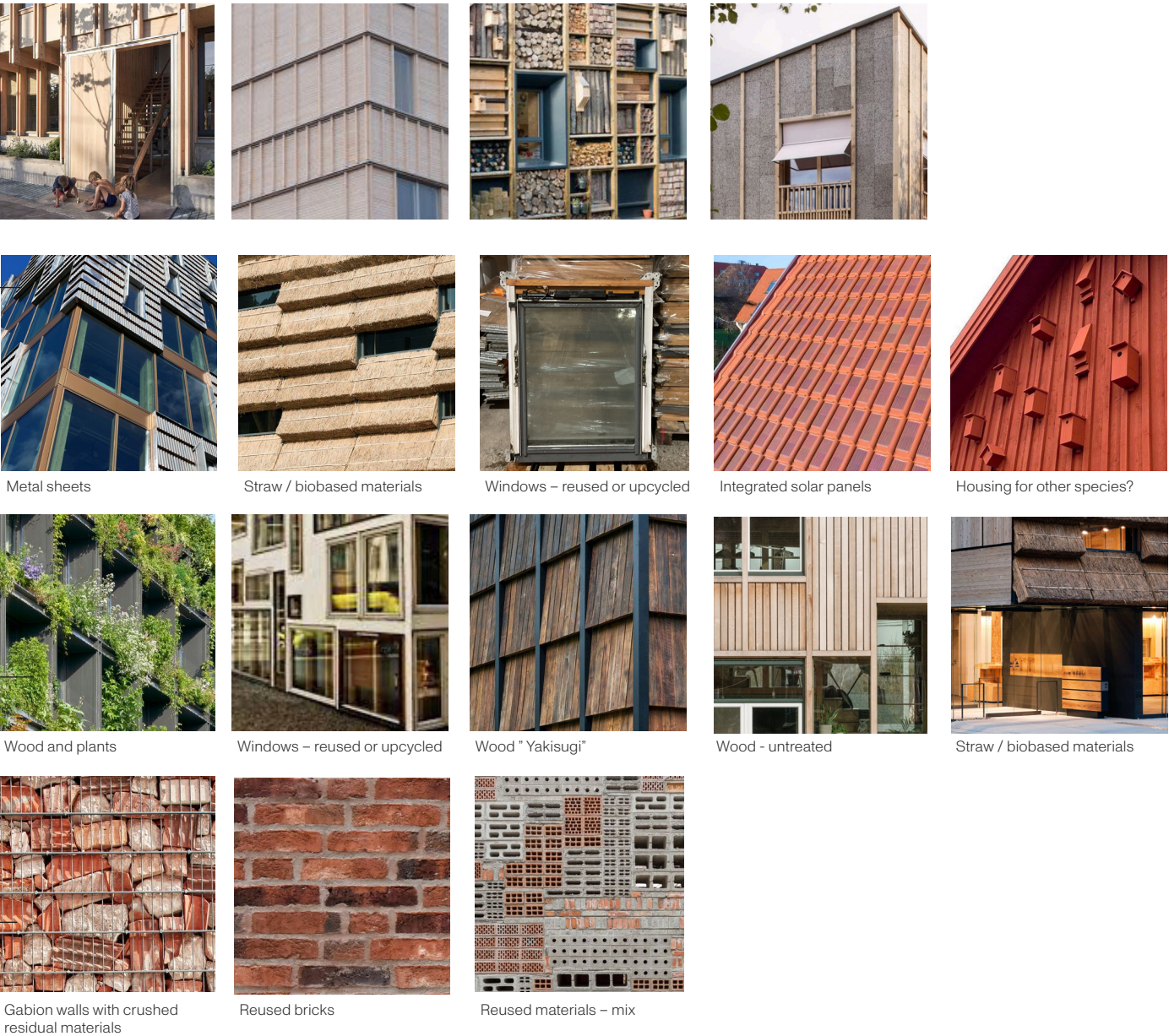


Overall façade grid that unifies the architectural concept while allowing material variations.

Lightweight roof materials and windows – primarily reused.

Façade materials – primarily biobased materials.

Base materials – primarily reused and residual materials.





Integrated design

Flexible construction allows buildings to be adapted for new uses over time. When built to be ****robust—both aesthetically and structurally—****such buildings have the potential to become the heritage architecture of the future.

Both qualities reduce the likelihood of demolition and replacement, which would otherwise generate new CO₂ emissions. Flexible buildings can also improve space efficiency and reduce the need for relocation by allowing occupants to remain in the same structure even as needs and functions change. Flexibility can be achieved when the structural system supports adaptable façades and floor plans.

LEV House aims to work with timber structures, potentially in a hybrid configuration, where traditional systems are used along the outer walls and core areas, while interior parts are constructed from lighter timber elements. Floor slabs are envisioned as reused precast concrete hollow-core elements.

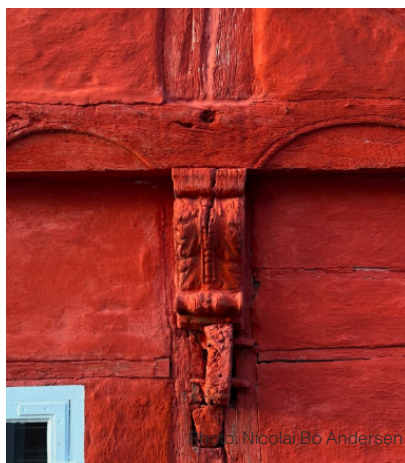
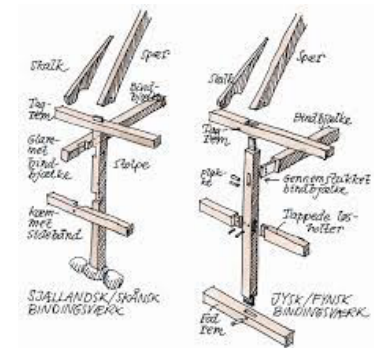
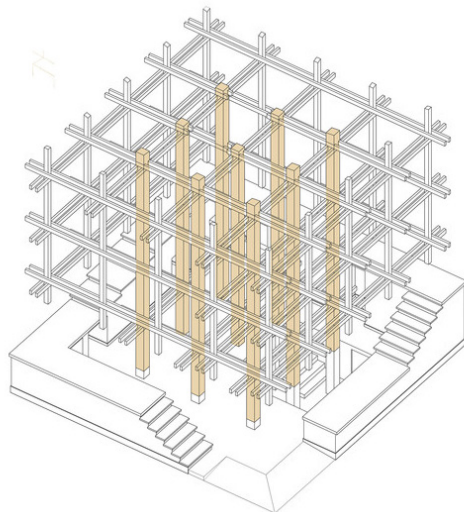
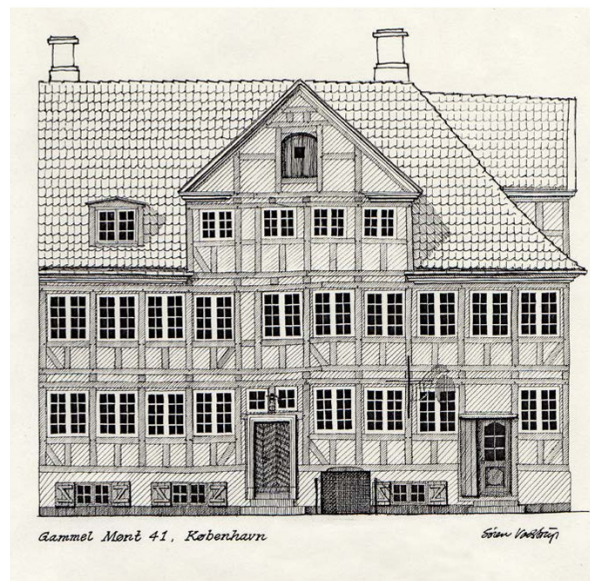
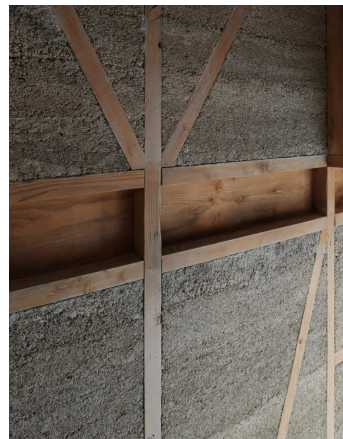


Photo: Nicolai Bo Andersen

Biobased materials connect the building to a local and contextual practice.



Gammel Mønt 41, København

Sören Västberg

The beauty of exposed structures – a unified colour ties together different materials, alterations, and repairs over time.

16 Design study / LEV House / October 2025



Energy and integrated technology

A key element of LEV House's climate strategy is the integration of renewable energy in the form of solar panels on the roof surfaces. As the project develops, it is recommended to employ energy simulation tools to analyse energy consumption and ensure optimal design choices for heating, ventilation, and climate systems (HVAC).

In the longer term, LEV House is expected to connect to district heating when available. Until then, alternative solutions such as heat pumps or other fossil-free systems can be implemented—potentially in combination with ventilation windows and heat recovery systems.

The building also applies passive design principles to maximise natural heating, cooling, and lighting through strategies such as strategic window placement, thermal mass, insulation, and shading. The ambition is to achieve a net-zero energy building, where the energy produced through renewable sources equals or exceeds the building's total energy use.

Building management systems (BMS) with smart sensors are integrated to optimise energy performance, monitor indoor climate, and regulate lighting, temperature, and humidity. This enables more efficient management of building resources and reduces waste through automation and IoT. Automated control of lighting, temperature, and even waste sorting can further minimise the building's environmental impact.



A light atrium brings daylight into the building and supports a healthy indoor climate through natural ventilation.



Existing building systems, structures, and materials as a resource

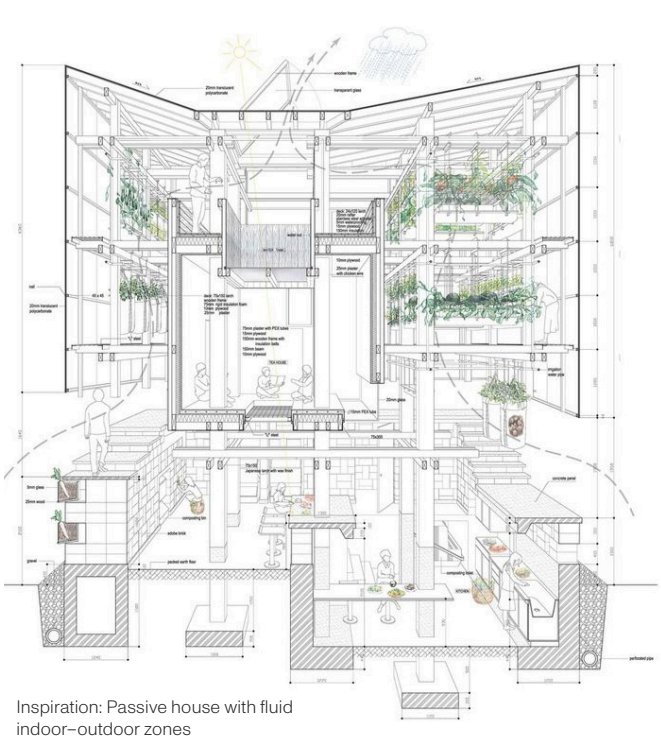


Design for disassembly - inspiration
from Villum Window Collection



LEV House's interior can be arranged flexibly to accommodate different programmatic needs over time. The open floor plans allow for a high degree of adaptability, making it possible to transform the spaces between housing, commercial, or exhibition use. The interior expresses the building's structural principles and enables the use of a high proportion of biogenic materials, as the spaces are protected from weather exposure.

Visualisation of storeys 4-6 in URBAN LIVING's light atrium.



Inspiration: Passive house with fluid indoor-outdoor zones

Daylight, health, and well-being

LEV House is based on principles of good daylight design. The dwellings are developed with a focus on spatial experience, demonstrating daylight strategies that consider both the tone and direction of light.

With a building depth of 18×18 metres—significantly wider than the typical 12-metre recommendation for naturally lit dual-aspect apartments—the design incorporates a central light atrium with roof windows that bring daylight through the entire building, from roof to ground floor.

According to BR2020, window areas must comprise 15% of the floor area. The proposed concept exceeds this requirement through the use of passive solar shading integrated into the façade, a detail that will be further refined in the next design phases.

LEV House also employs a passive ventilation system based on a two-storey division of the building. This approach can be integrated into the fire strategy, segmenting the building into two-storey zones (under 1,000 m²) for both safety and environmental performance.

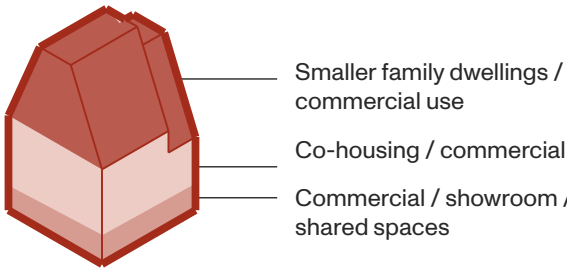




Programming: flexibility and future-proofing

LEV House's dimensions and structure allow for a high degree of flexibility and transformation over time. The building can easily be adapted for a variety of uses:

- **The central daylight atrium ensures that daylight requirements for both residential and commercial functions can be met**
- **Staircases, elevators, and potentially access balconies enable flexible use of the floors, allowing them to function independently of one another.**
- **Toilets, bathrooms, cores, and technical shafts are positioned to accommodate the needs of multiple user groups.**
- **Spatial divisions are primarily defined by the placement of service and technical zones, while any additional partitions are constructed as lightweight, biobased walls designed for disassembly and reuse.**



Shared spaces connected to the dwellings create opportunities for everyday community life. Traditionally, local plans have required at least 1% of the total floor area to be designated as communal space for housing developments, and a minimum of 12.5% for co-housing schemes.

LEV House includes a high proportion of shared spaces, encouraging close neighbourly relationships and fostering a greater sense of security, ownership, and shared economy.

Sharing communal facilities adjacent to the home can reduce both space requirements and the consumption of products per person. Housing typologies with a strong sense of community typically have a lower climate footprint, as sharing encourages more resource-conscious and climate-friendly lifestyles.



Shared kitchens and bathrooms reduce resource consumption within individual dwellings and encourage a more climate-conscious way of living.

” *Research points to many sustainable benefits of living in co-housing communities.*

40% Lower CO₂ footprint

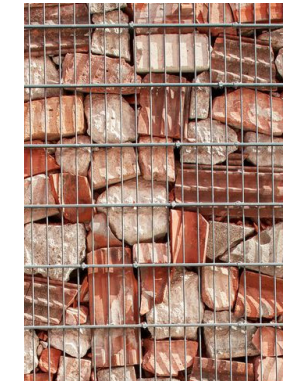
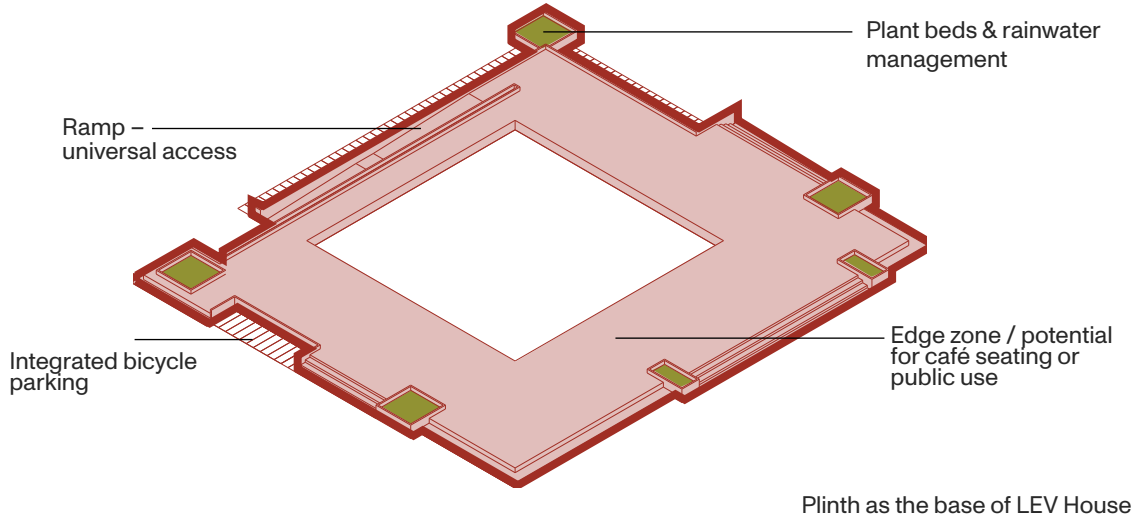
60% less food waste

80% fewer car kilometres

Source: Dilemmas and Synergies between Biodiversity, Climate, and Urban Quality, City of Copenhagen, 2025



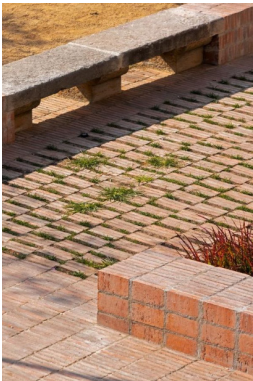
Shared facilities such as laundries, workshops, and similar spaces can also help create an active ground floor.



Gabion walls using residual materials that cannot be repurposed otherwise



Gabion walls with biogenic materials



Plinth in reused tiles



Rain gardens

Urban space, edge zones, biodiversity, and rainwater management

As much urban nature as possible should be introduced in connection with LEV House and as part of the wider green planning strategy for the area. This approach not only enhances the building's amenity value for residents but also benefits biodiversity, urban wildlife, and climate adaptation.

The building is situated on a unifying plinth, which—during the early years before the surrounding area is fully developed—will act as the connecting element between the quay and the building itself, while providing access to a floor level approximately +0.75 m above the existing terrain.

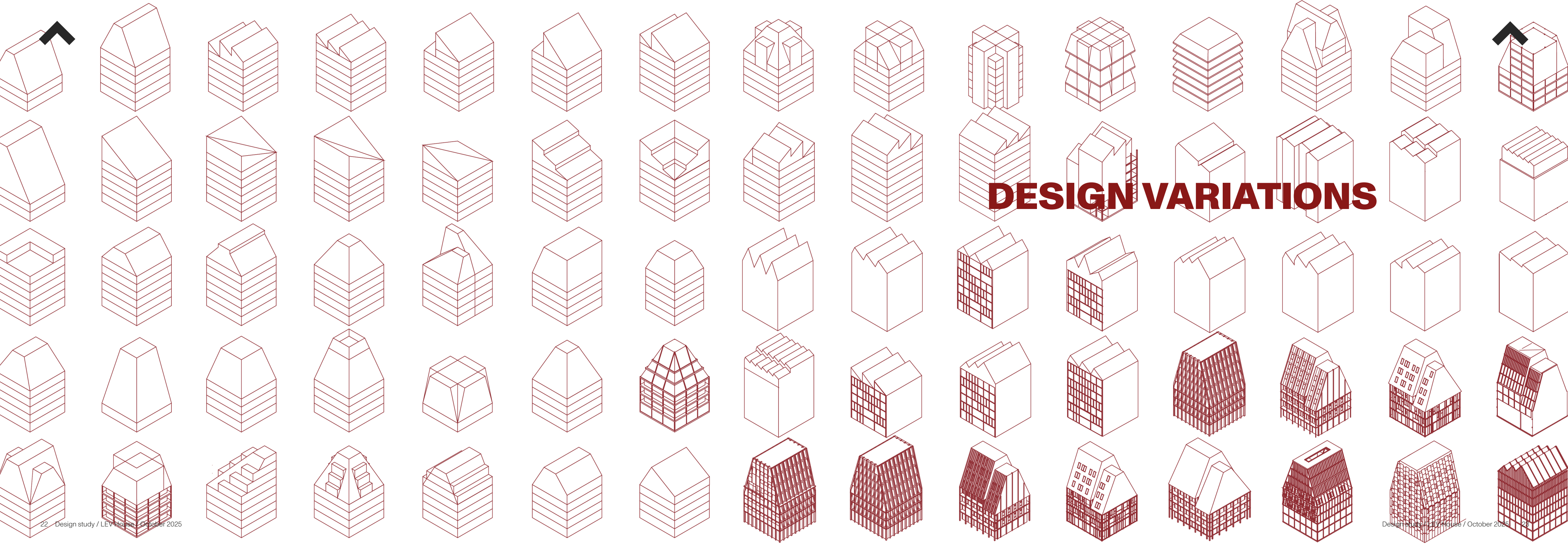
Edge zones and balconies extend the residents' private outdoor spaces while also providing “eyes on the street.” They create opportunities for engagement with street life and contribute to a sense of an inhabited, vibrant, and active urban district.

A robust local rainwater management system is planned, incorporating ground-level collection basins that support added ecological value and biodiversity. Rainwater is viewed not as a problem but as a resource to be used positively. The cleanest surface water will be reused locally—for instance, for irrigation, toilet flushing, and laundry.

Along the building, permeable surfaces and drainage channels will ensure that rainwater is guided to local LID (LAR) systems, with overflow directed to nearby green areas.

The design also includes opportunities for climbing plants and planters integrated into the façades, as well as shared rooftop greenhouses, strengthening both the ecological and social dimensions of the project.



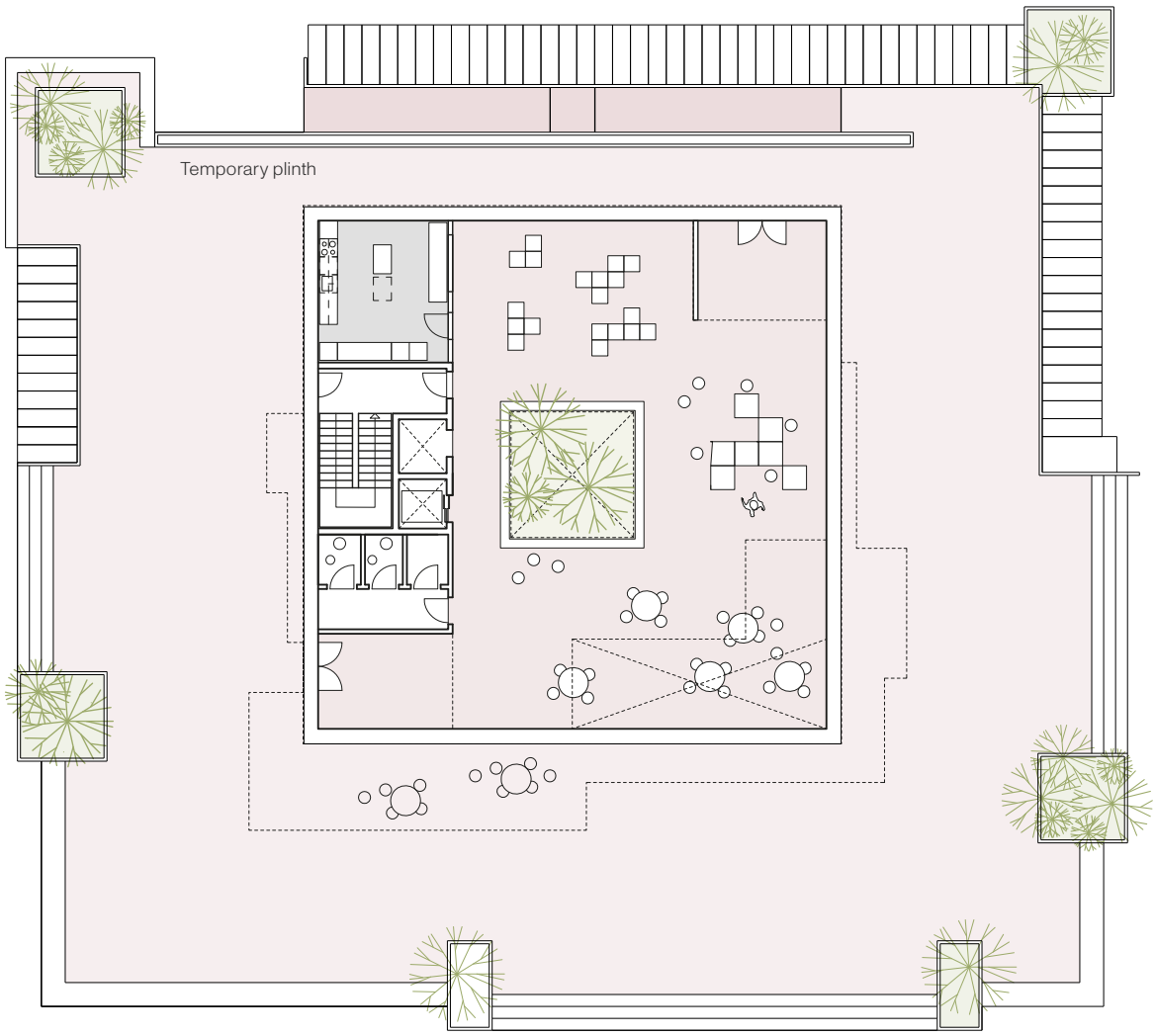


DESIGN VARIATIONS



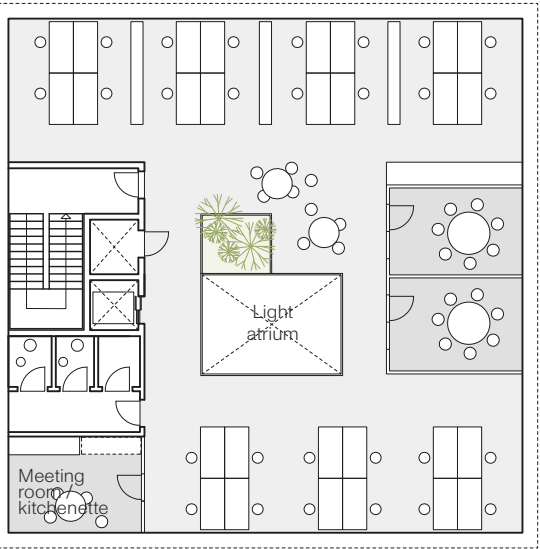
Ground floor principle

1:250 Commercial / Showroom 324 m²



Typical floor plan principle

1:250 Commercial / Housing 2nd–6th floor 300 m²



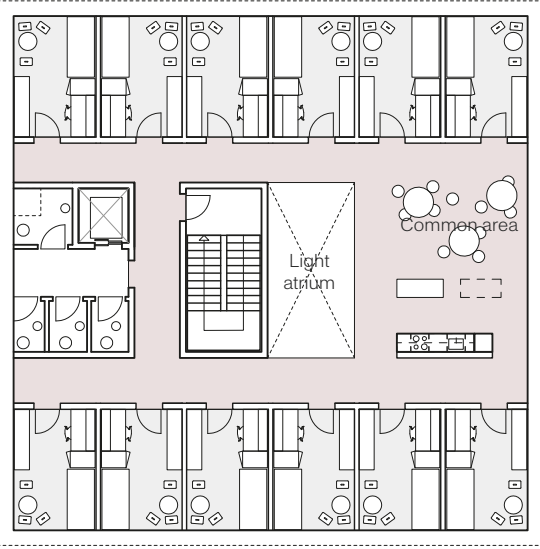
Commerical

Net total: 28 workstations per floor

Area: **1,720 m²**
Number of dwellings: **0**
Heavy / light walls: **65% / 35%**
Wet rooms + stairs / floor area: **13%**
Window ratio: **40%**
GWP / floor / year: **1,302 kg CO₂e**
GWP / person / year: **69 kg CO₂e**

GWP/m²/year: **5.3 kg CO₂e**

Preliminary calculation – may vary by ±10% during further project development. The climate impact is calculated for the same floor type across all seven storeys.



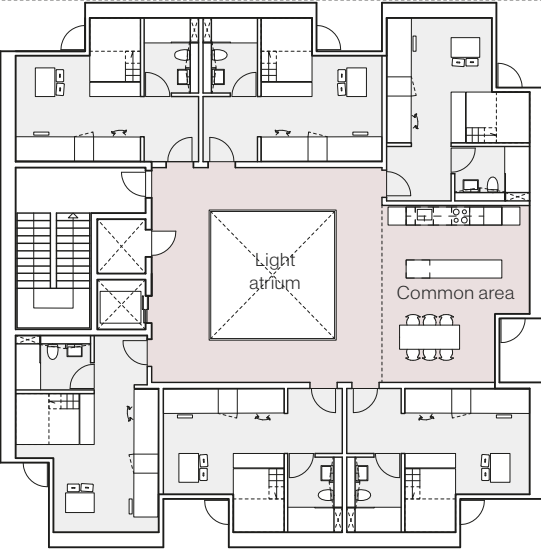
Micro dwellings: 12 units per floor

Net area: 10 m² per dwelling / 10 m² per person

Area: **1,720 m²**
Number of dwellings: **84 (84 persons)**
Heavy / light walls: **65% / 35%**
Wet rooms + stairs / floor area: **13%**
Window ratio: **23%**
GWP / dwelling / year: **90 kg CO₂e**
GWP / person / year: **90 kg CO₂e**

GWP/m²/year: **4.4 kg CO₂e**

Preliminary calculation – may vary by ±10% during further project development. The climate impact is calculated for the same floor type across all seven storeys.



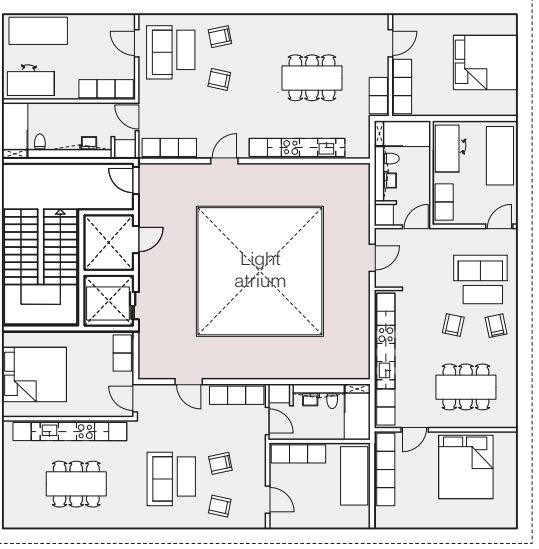
Compact dwellings: 6 units per floor

Net area: 26 m² per dwelling / 26 m² per person

Area: **1,720 m²**
Number of dwellings: **42 (50 persons)**
Heavy / light walls: **35% / 65%**
Wet rooms + stairs / floor area: **18%**
Window ratio: **23%**
GWP / dwelling / year: **176 kg CO₂e**
GWP / person / year: **147 kg CO₂e**

GWP/m²/year: **4.3 kg CO₂e**

Preliminary calculation – may vary by ±10% during further project development. The climate impact is calculated for the same floor type across all seven storeys.



Family / shared housing: 3 units per floor

Net area: 65–72 m² per dwelling / 36–40 m² per person

Area: **1,720 m²**
Number of dwellings: **21 (48 persons)**
Heavy / light walls: **35% / 65%**
Wet rooms + stairs / floor area: **13%**
Window ratio: **23%**
GWP / dwelling / year: **344 kg CO₂e**
GWP / person / year: **150 kg CO₂e**

GWP/m²/year: **4.2 kg CO₂e**

Preliminary calculation – may vary by ±10% during further project development. The climate impact is calculated for the same floor type across all seven storeys.



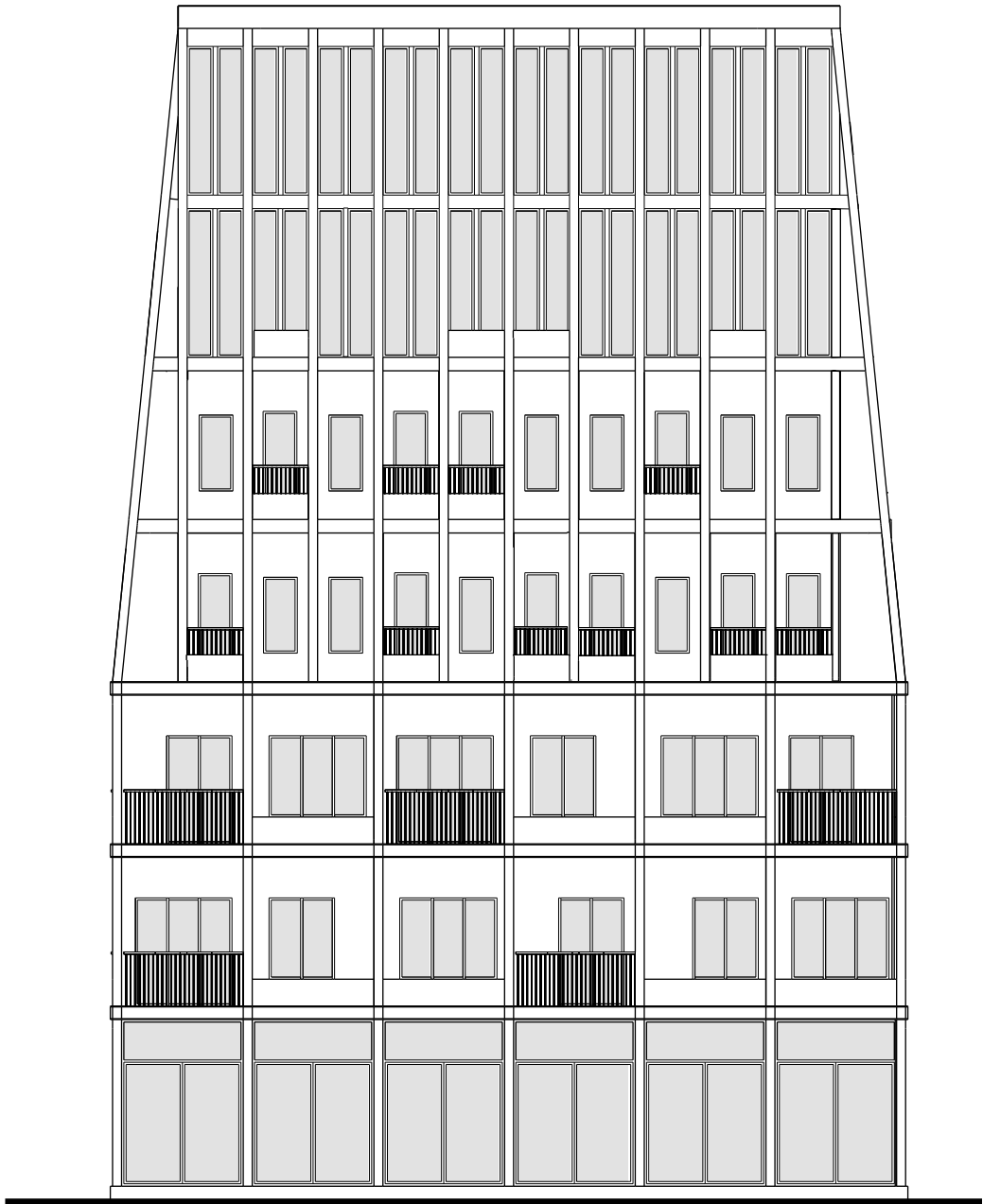
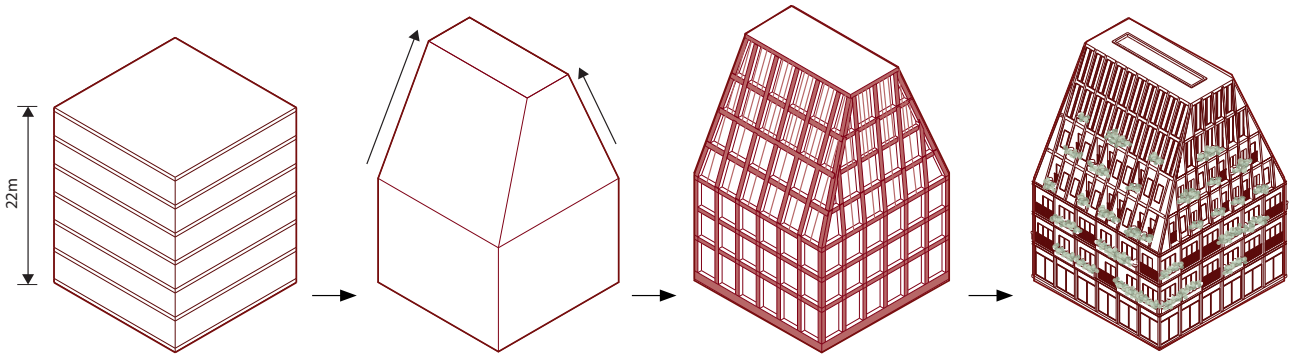
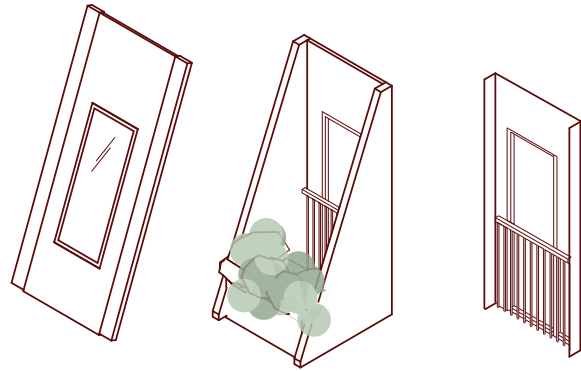
LEV Max design strategy

GWP/m²/year: **4.1 kg CO₂e**

The design proposal is based on the Living Places geometry and seeks to optimise the building volume by using as few façade square metres as possible. In doing so, the project achieves a lower climate impact than a more articulated façade geometry would.

The façade is unified by an overall grid that becomes finer from the ground floor towards the roof. This gradation scales the building to a more human and inviting dimension at street level, while the grid also functions as passive solar shading, providing greater protection on the upper roof levels than at the ground floor.

The infill of the façade grid consists primarily of reused metals such as zinc or corrugated sheets, supplemented with biogenic materials like slate or Yakisugi wood—a carbonisation technique that enhances durability against weather, mould, insects, and moisture through controlled burning. The proposal employs three window types within the overall façade grid: a roof window, a French/Spanish balcony, and a French balcony with integrated planter box. The planters contribute to the building's rainwater collection system.







LEV Next design

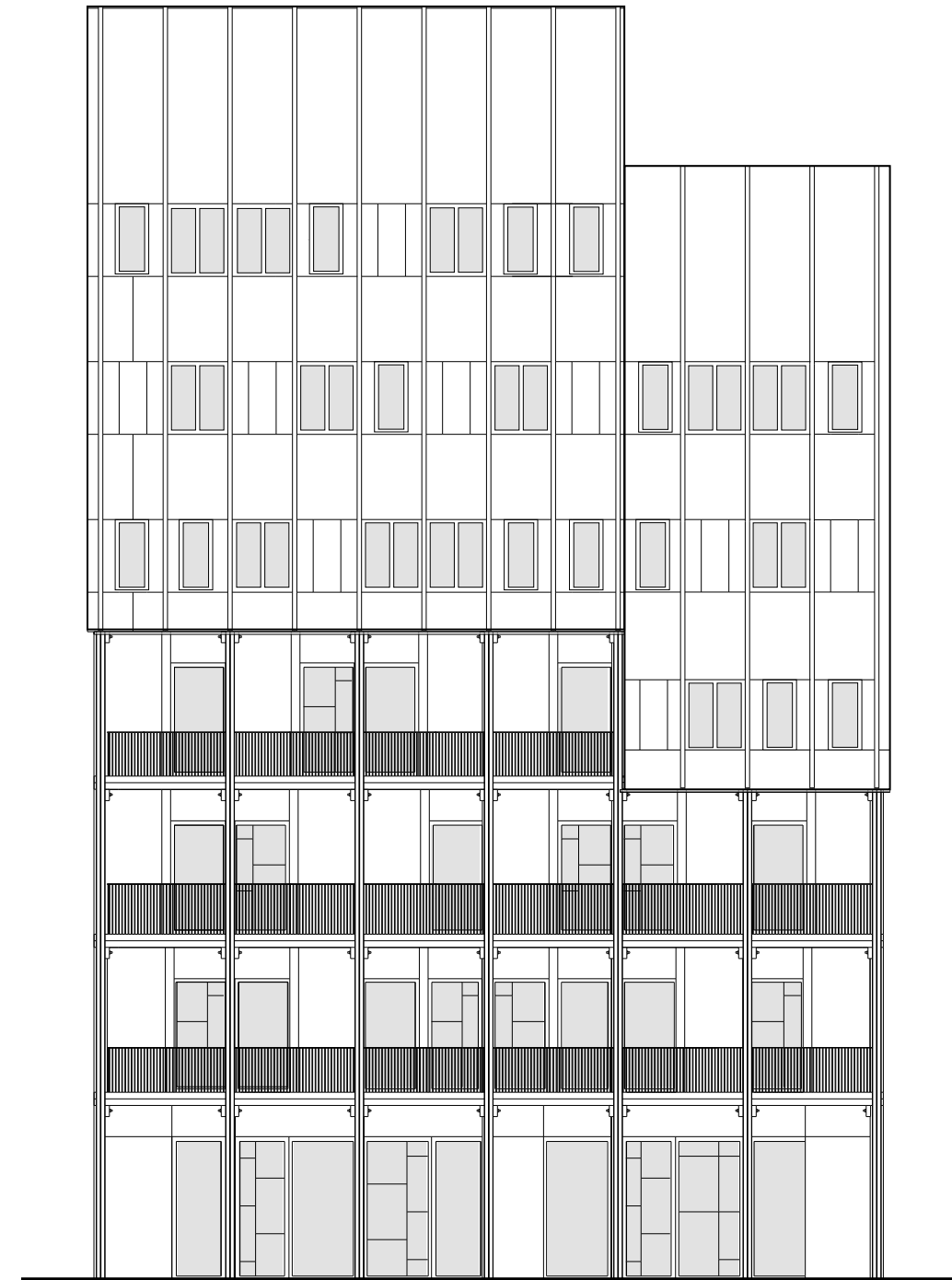
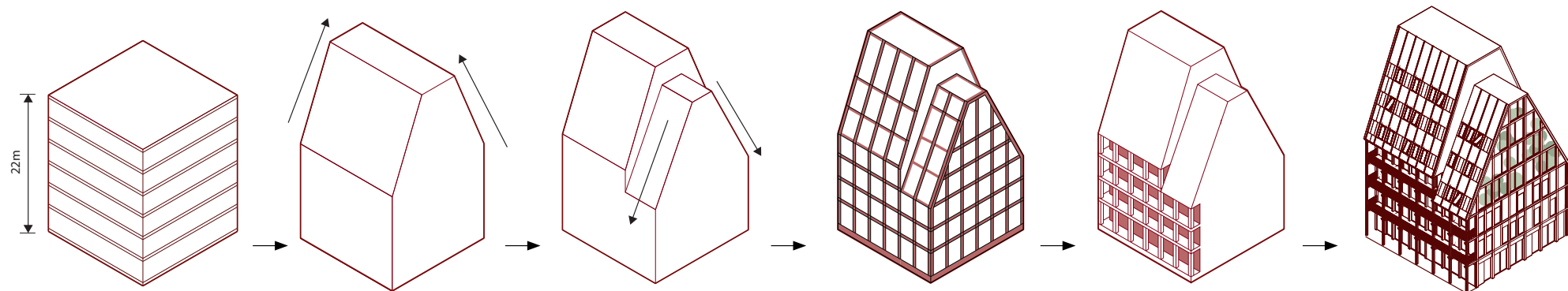
GWP/m²/year: **4.2 kg CO₂e**

The design proposal is based on the Living Places geometry, with the volume divided into two offset parts to highlight the location of the shared spaces on the upper levels.

The scaled-down roofline also nods to the design principles of the surrounding urban context, creating a stepped façade that brings more daylight to the street.

The façade is unified by an overall grid that allows for variation in material expression. The ground floor features heavy reused materials, while the access gallery on the upper floors provides passive protection from rain, enabling the use of biogenic materials such as wood, straw, and eelgrass.

The roof is envisioned in reused clay tiles or metal, such as corrugated sheets, a material commonly used in the area's industrial architecture. On the roof level, shared spaces are oriented towards the south, complemented by greenhouses that provide passive heat to the building and offer roof terraces for residents and building users.





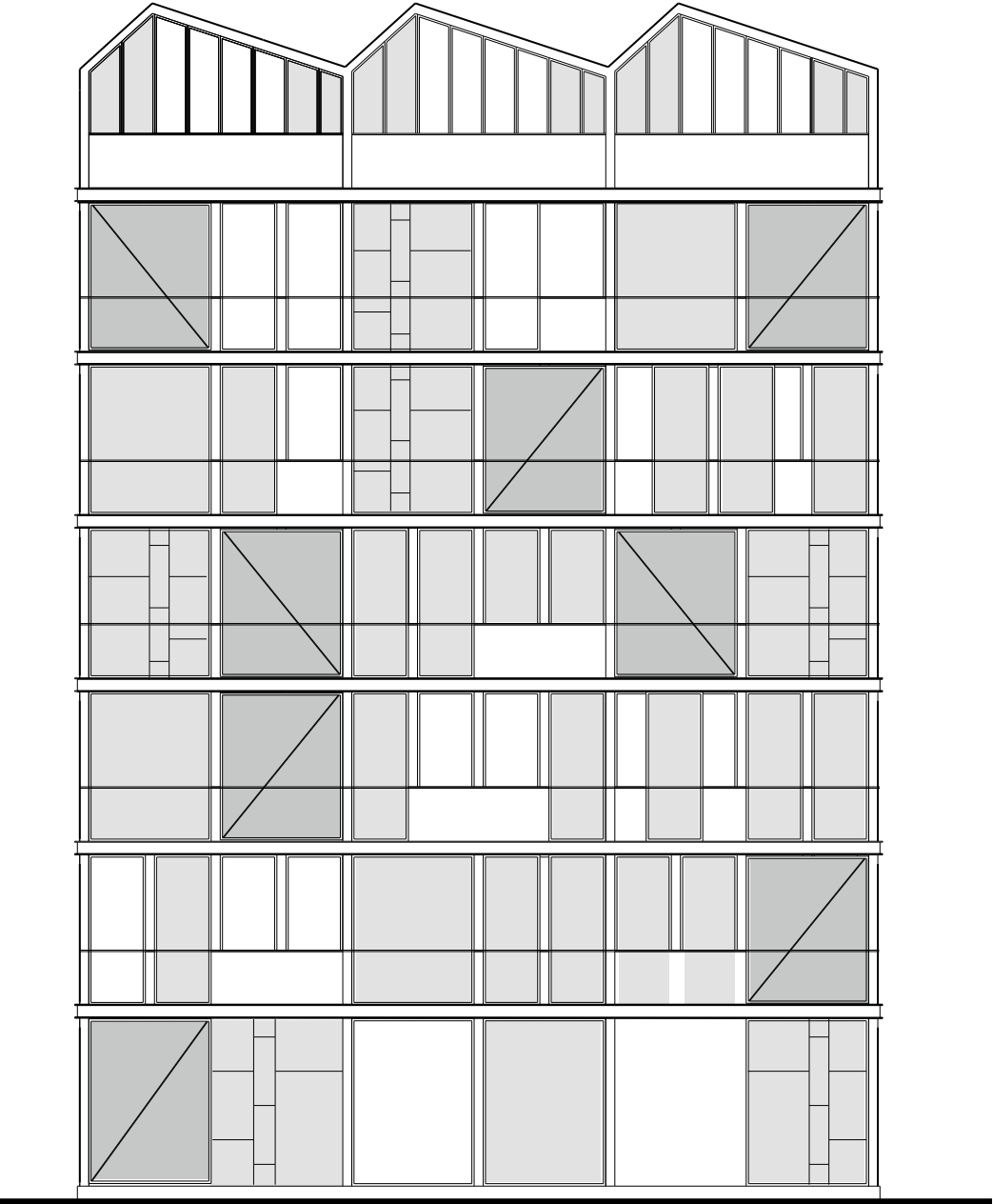
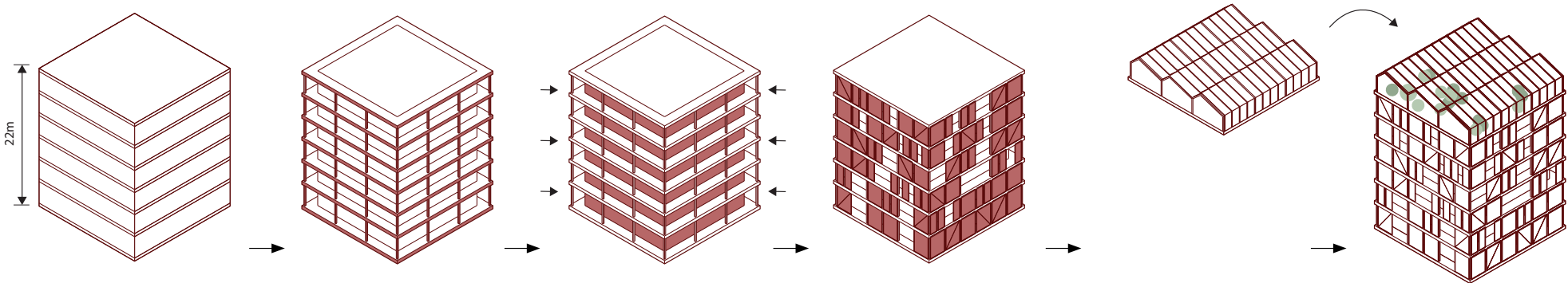


LEV Mix design

GWP/m²/year: **4.3 kg CO₂e**

The design proposal takes its starting point in the industrial context of the area, drawing inspiration from the technical architecture of cranes. The building is conceived as a lightweight structure with biogenic façade materials, passively protected by projecting access balconies and light, flexible screens—for example, polycarbonate panels or perforated corrugated sheets. These screens also function as solar shading elements.

The roof is designed with shed profiles, and the top floor accommodates shared spaces, greenhouses, and roof terraces, creating a vibrant and climate-responsive upper level.







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